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(54) **SELF-ACTIVATION OF USER DEVICE**

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(51) **Int. Cl.**
H04L 29/06 (2006.01)
G06F 21/44 (2013.01)

(52) **U.S. Cl.**
CPC ***H04L 63/0884*** (2013.01); ***G06F 21/44*** (2013.01)

(58) **Field of Classification Search**
CPC H04L 63/18
USPC 726/7
See application file for complete search history.

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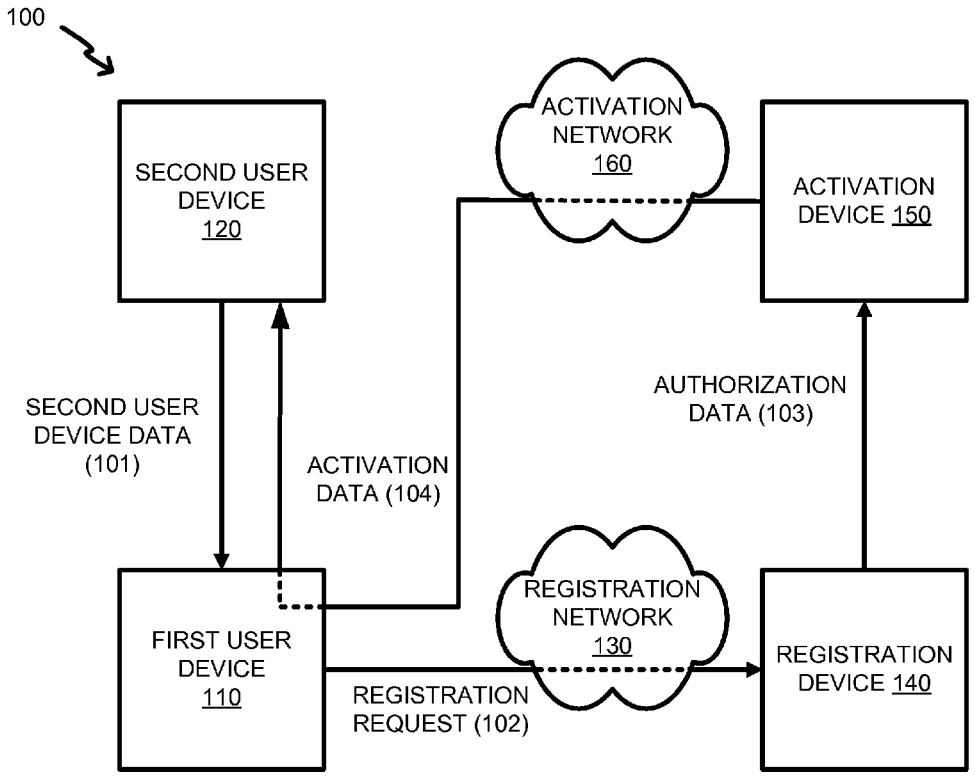
Primary Examiner — Jason K Gee

(57) **ABSTRACT**

A first user device and second user device may be coupled, such as by an audio interface included in the second user device. The second user device is unable to generate a registration request, and the first user device may acquire device data associated with the second user device and form the registration request. The registration request may include the device data and information associated with the first user device. The registration request may be authenticated, and activation data may be generated based on the information associated with the first user device and the device data. The activation data is forwarded to the second user device to enable the second user device to access a restricted service or data.

20 Claims, 12 Drawing Sheets



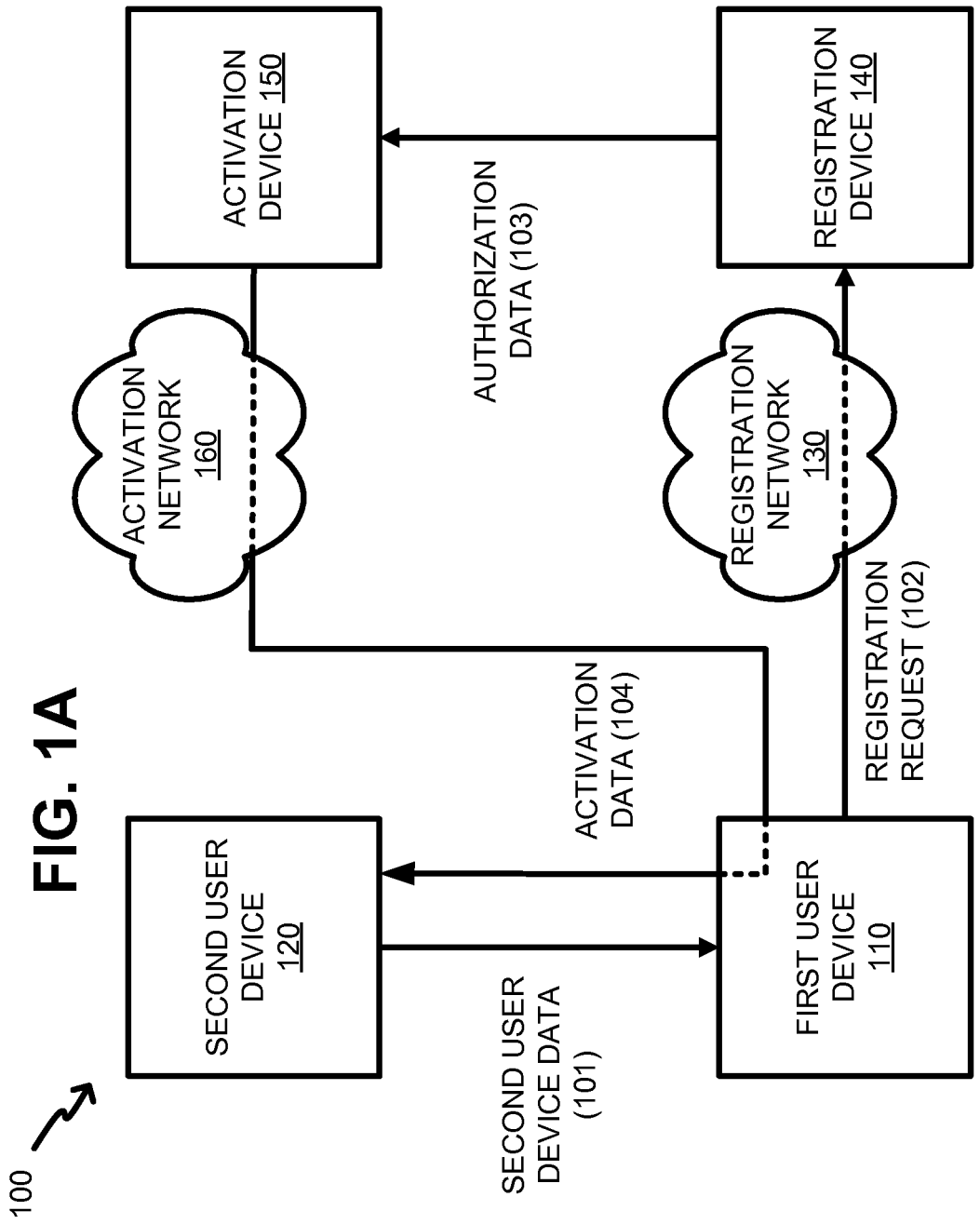

100
SECOND USER DEVICE 120
FIRST USER DEVICE 110
ACTIVATION DEVICE 150
REGISTRATION DEVICE 140
ACTIVATION NETWORK 160
REGISTRATION NETWORK 130
SECOND USER DEVICE DATA (101)
ACTIVATION DATA (104)
AUTHORIZATION DATA (103)
REGISTRATION REQUEST (102)

FIG. 1A

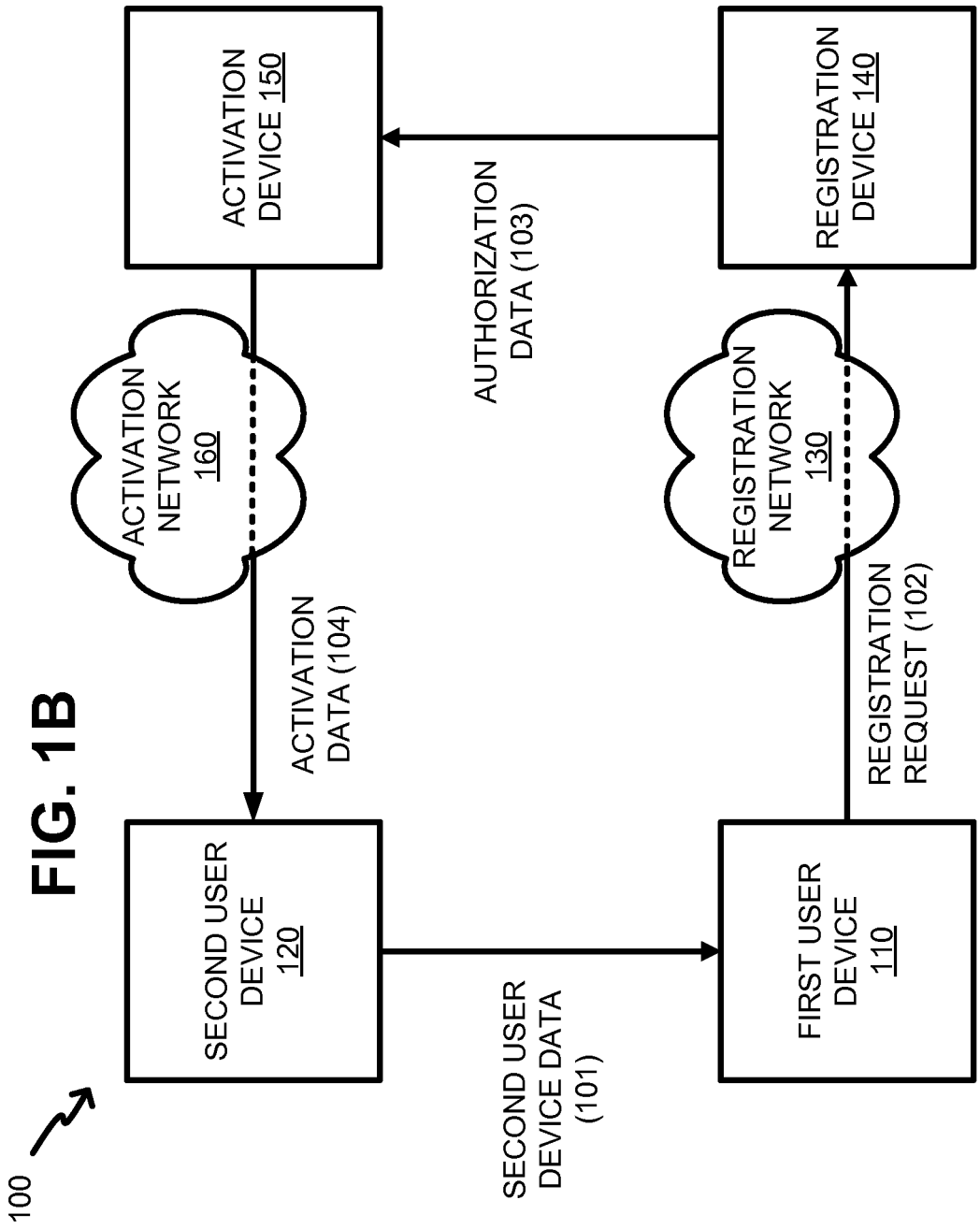

100
SECOND USER DEVICE 120
FIRST USER DEVICE 110
ACTIVATION DEVICE 150
REGISTRATION DEVICE 140
ACTIVATION NETWORK 160
REGISTRATION NETWORK 130
SECOND USER DEVICE DATA (101)
AUTHORIZATION DATA (103)
ACTIVATION DATA (104)
REGISTRATION REQUEST (102)

FIG. 1B

FIG. 2A

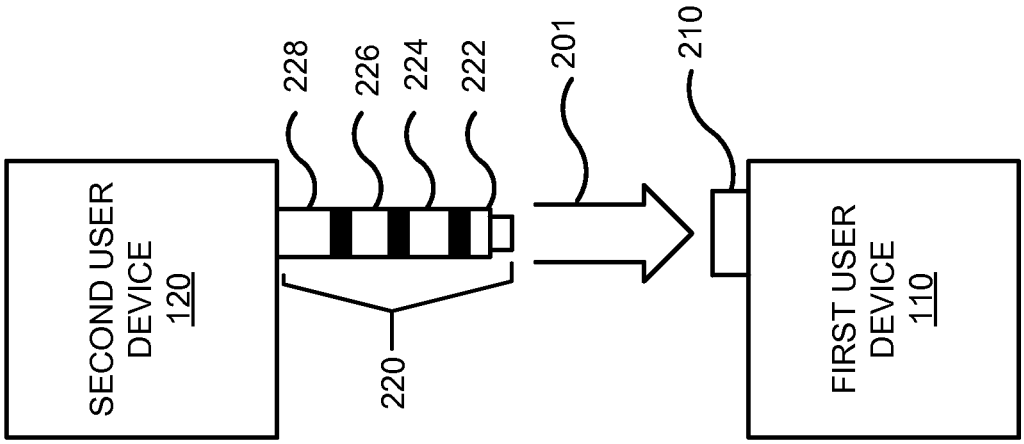

SECOND USER DEVICE 120
228
226
224
222
220
201
210
FIRST USER DEVICE 110

FIG. 2C

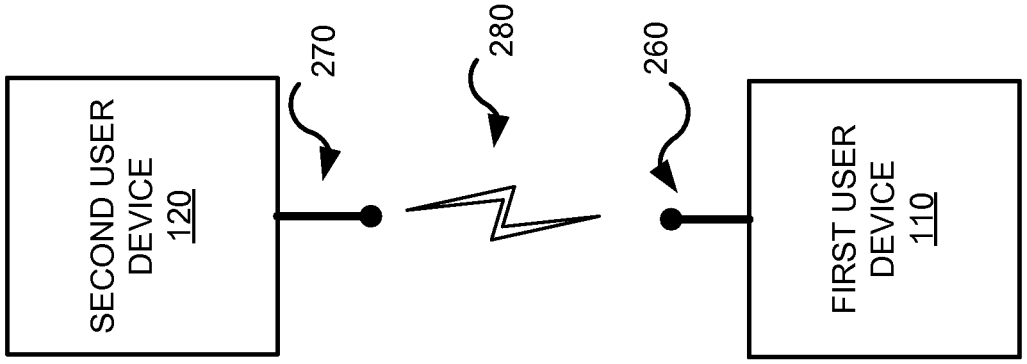

SECOND USER DEVICE 120
270
280
260
FIRST USER DEVICE 110

FIG. 2B

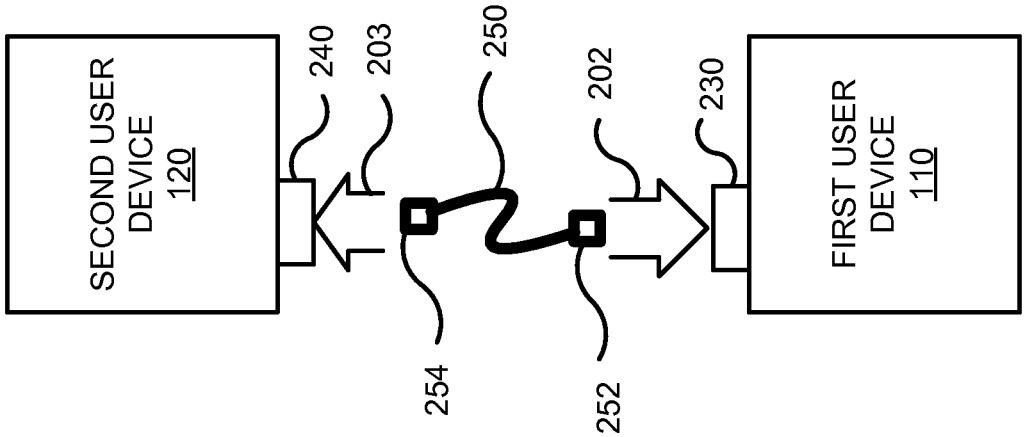
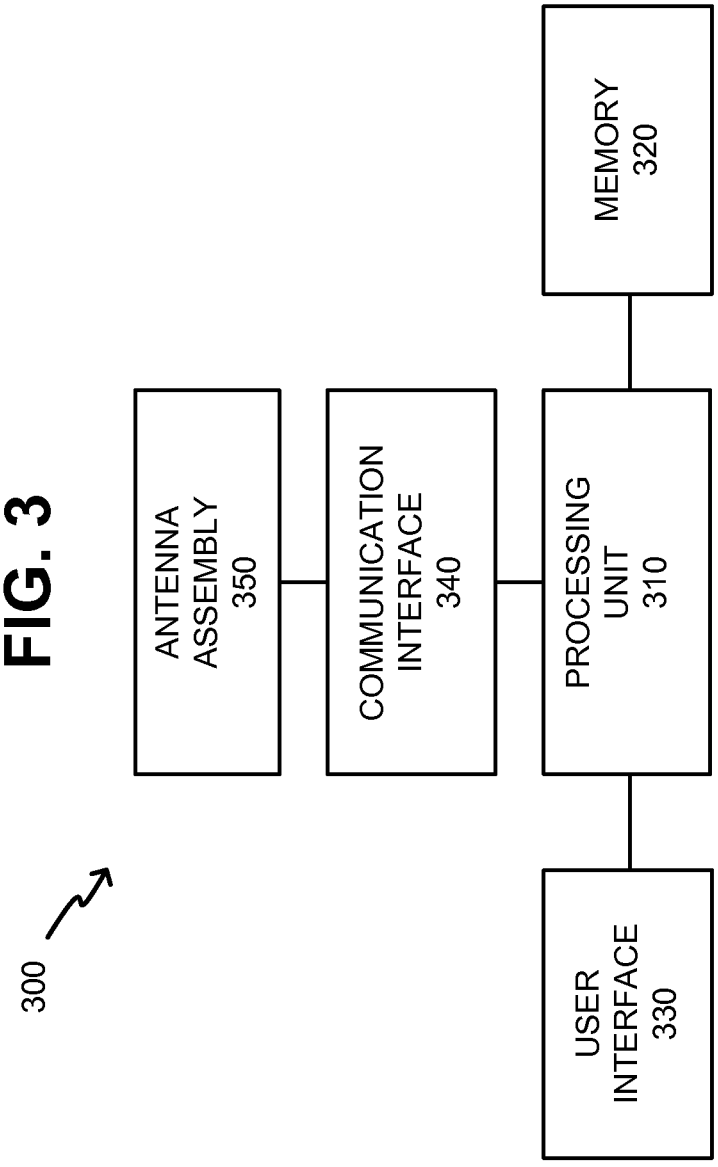

SECOND USER DEVICE 120
240
203
250
202
230
FIRST USER DEVICE 110
254
252

FIG. 3


300
ANTENNA ASSEMBLY 350
COMMUNICATION INTERFACE 340
PROCESSING UNIT 310
MEMORY 320
USER INTERFACE 330

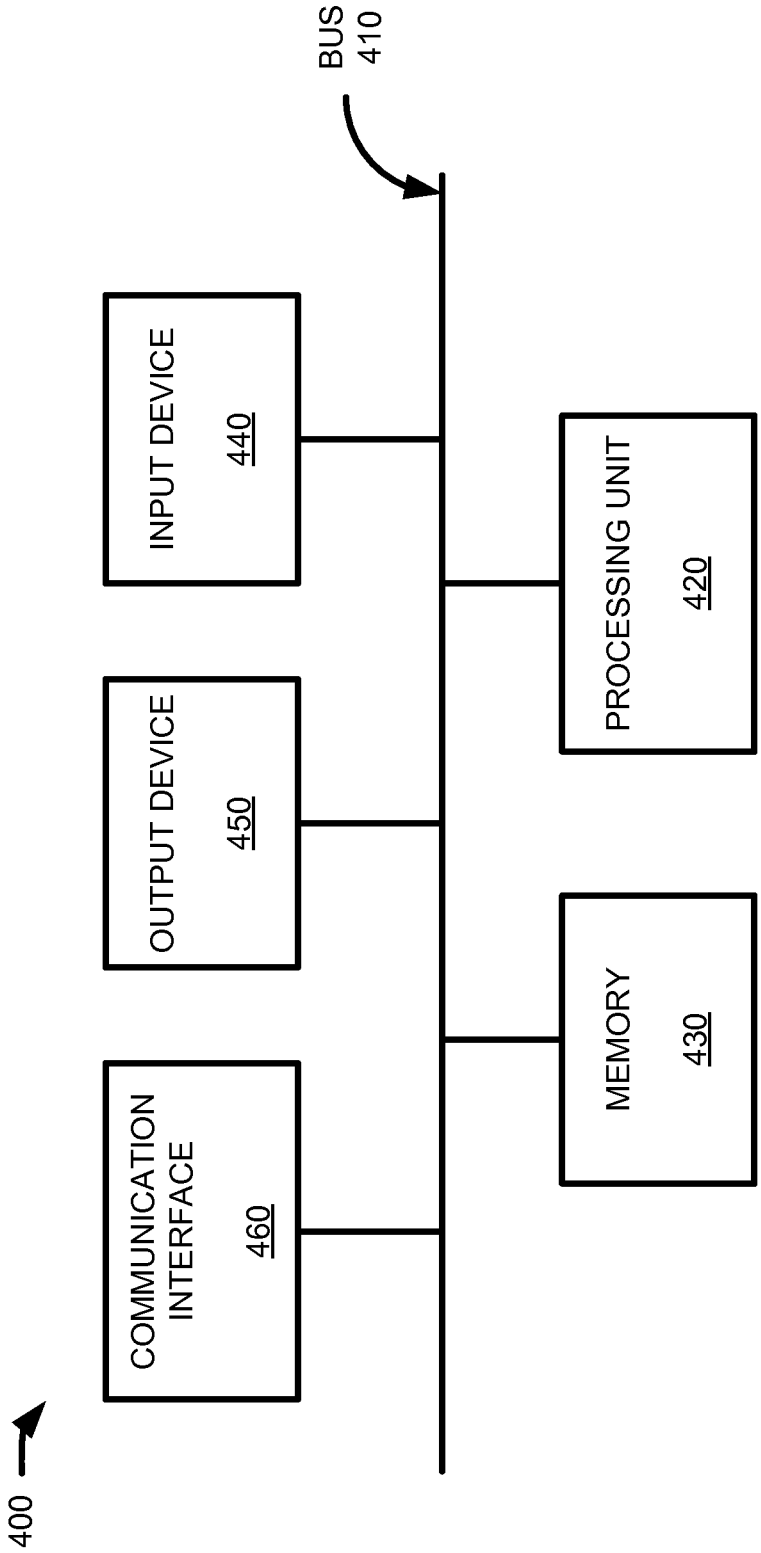

BUS
410
INPUT DEVICE
440
OUTPUT DEVICE
450
COMMUNICATION INTERFACE
460
PROCESSING UNIT
420
MEMORY
430
400

FIG. 4

FIG. 5

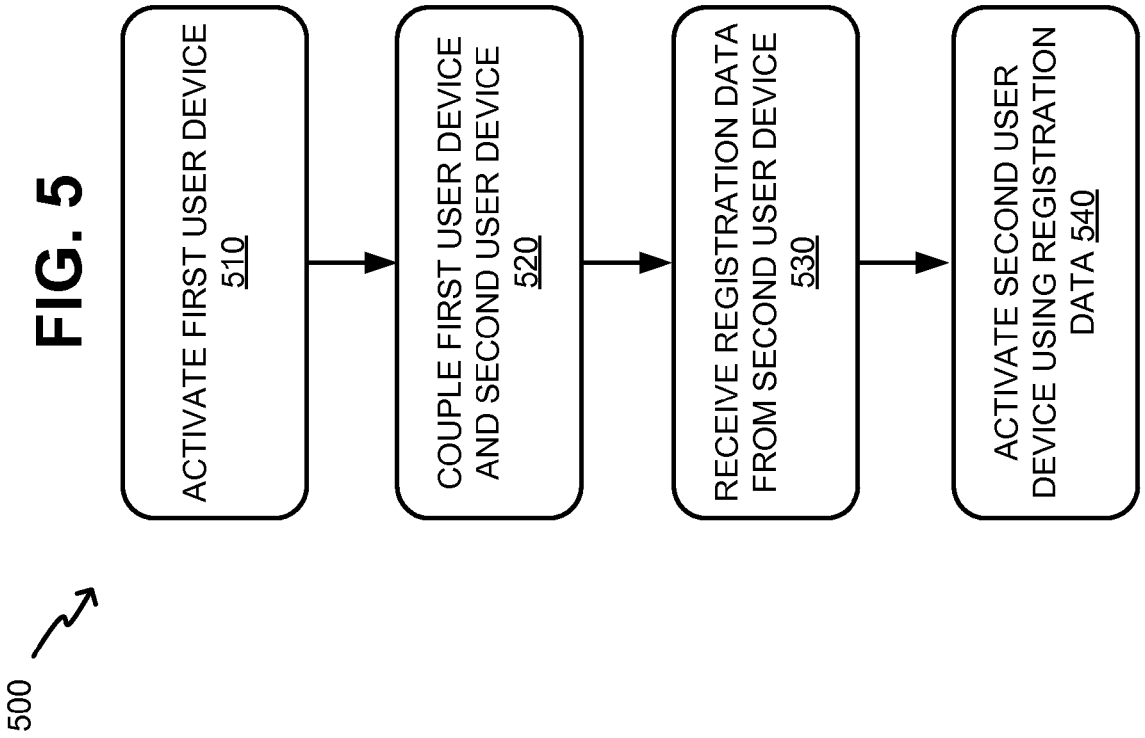

500
ACTIVATE FIRST USER DEVICE 510
COUPLE FIRST USER DEVICE AND SECOND USER DEVICE 520
RECEIVE REGISTRATION DATA FROM SECOND USER DEVICE 530
ACTIVATE SECOND USER DEVICE USING REGISTRATION DATA 540

FIG. 6

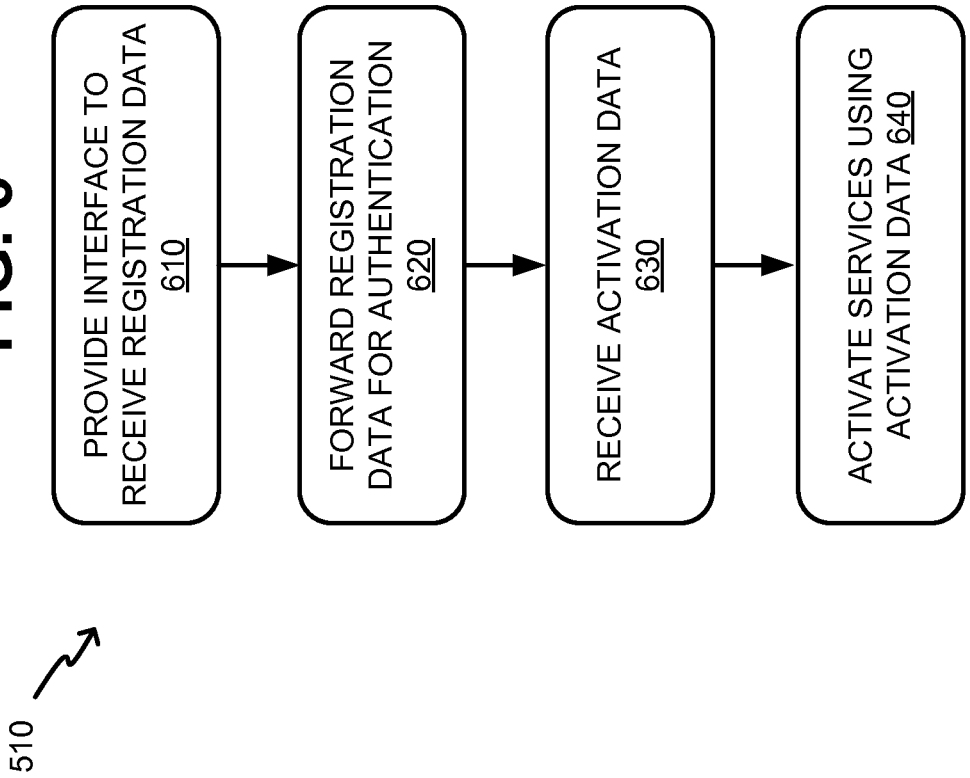
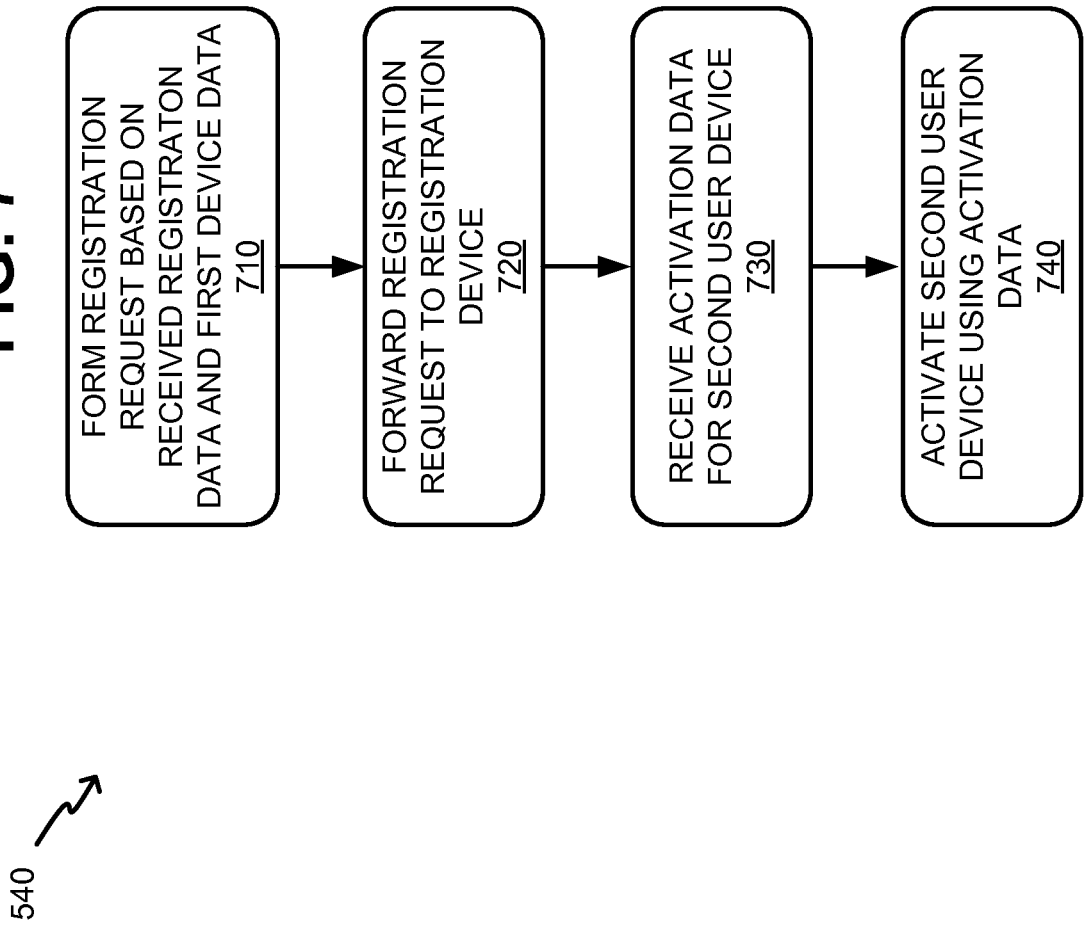

PROVIDE INTERFACE TO RECEIVE REGISTRATION DATA 610
FORWARD REGISTRATION DATA FOR AUTHENTICATION 620
RECEIVE ACTIVATION DATA 630
ACTIVATE SERVICES USING ACTIVATION DATA 640
510

FIG. 7


FORM REGISTRATION REQUEST BASED ON RECEIVED REGISTRATON DATA AND FIRST DEVICE DATA
710
FORWARD REGISTRATION REQUEST TO REGISTRATION DEVICE
720
RECEIVE ACTIVATION DATA FOR SECOND USER DEVICE
730
ACTIVATE SECOND USER DEVICE USING ACTIVATION DATA
740
540

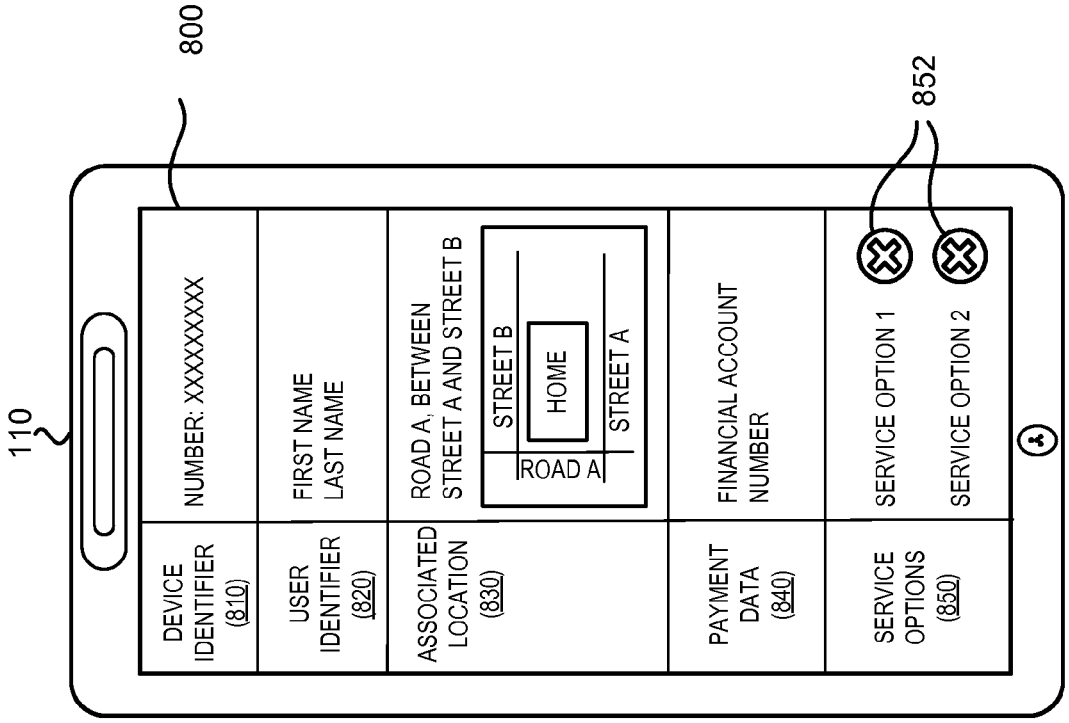

800
852
110
DEVICE IDENTIFIER (810)
NUMBER: XXXXXXXX
USER IDENTIFIER (820)
FIRST NAME LAST NAME
ASSOCIATED LOCATION (830)
ROAD A, BETWEEN STREET A AND STREET B
STREET B
HOME
ROAD A
STREET A
PAYMENT DATA (840)
FINANCIAL ACCOUNT NUMBER
SERVICE OPTIONS (850)
SERVICE OPTION 1
SERVICE OPTION 2

FIG. 8

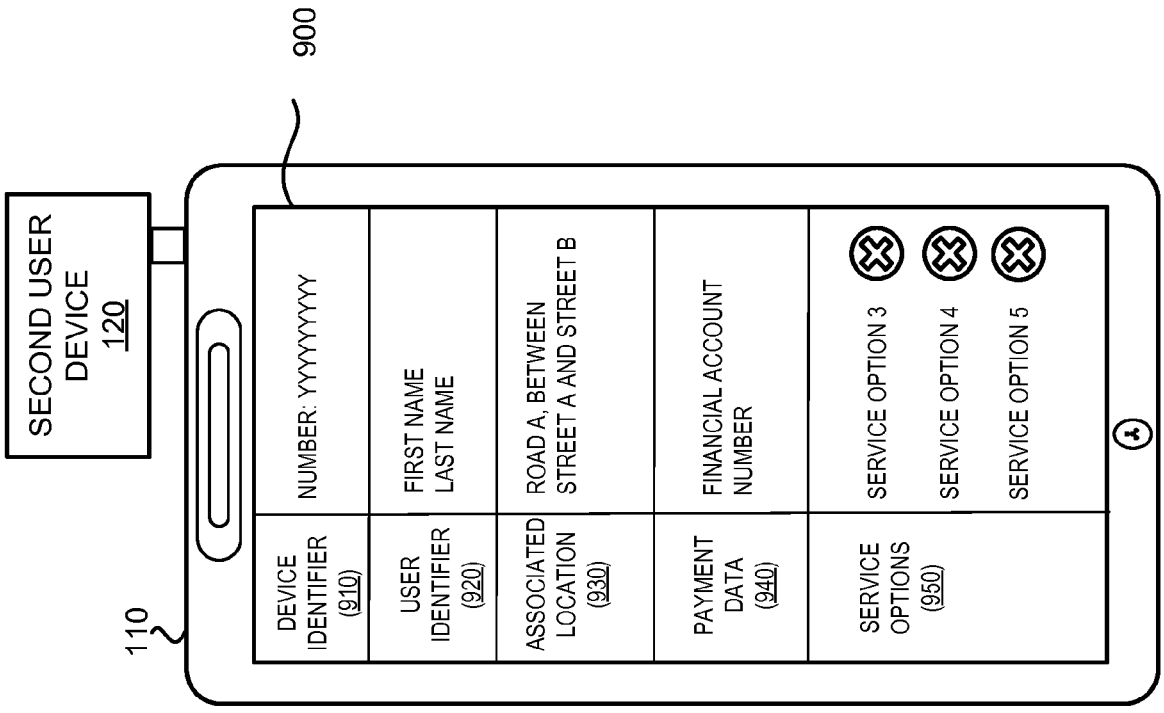
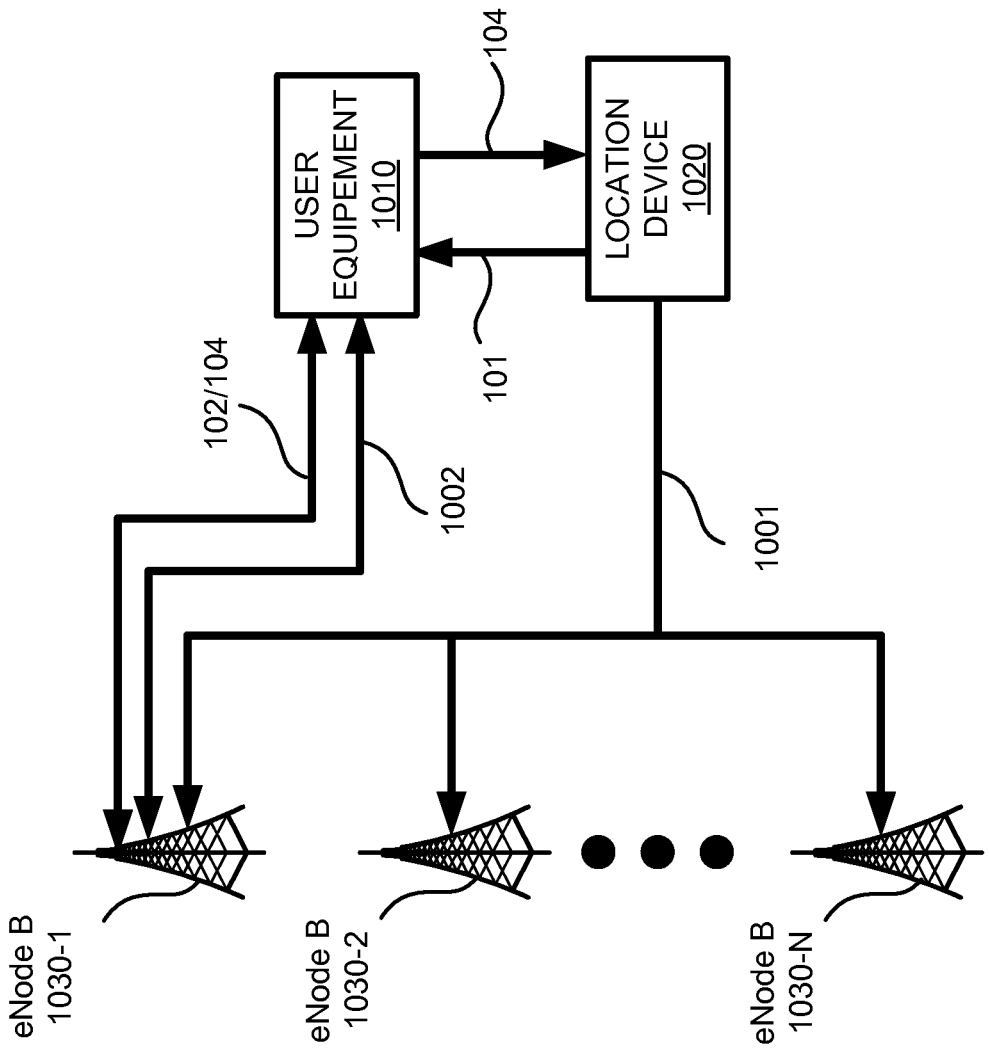

900
SECOND USER DEVICE 120
110
DEVICE IDENTIFIER (910)
NUMBER: YYYYYYYY
USER IDENTIFIER (920)
FIRST NAME LAST NAME
ASSOCIATED LOCATION (930)
ROAD A, BETWEEN STREET A AND STREET B
PAYMENT DATA (940)
FINANCIAL ACCOUNT NUMBER
SERVICE OPTIONS (950)
SERVICE OPTION 3
SERVICE OPTION 4
SERVICE OPTION 5

FIG. 9

FIG. 10


1000
USER EQUIPEMENT 1010
LOCATION DEVICE 1020
104
101
102/104
1002
1001
eNode B 1030-1
eNode B 1030-2
eNode B 1030-N

SELF-ACTIVATION OF USER DEVICE

BACKGROUND

Before a service provider allows a user device to access restricted resources, such as connecting to a network managed by the service provider, accessing content, etc., the user device is generally registered to associate the new device with a user and to receive information associated with the user, such as billing information for charging the user for services. After the user device is registered, the user device may be configured to access the restricted resources.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1**A and **1**B show exemplary devices that may be included in an environment in which systems and/or methods described herein may be implemented for user-initiated activation of a user device included in the environment;

FIGS. **2**A-**2**C show examples of connections between user devices included in the environment of FIG. **1**;

FIG. **3** shows a diagram of exemplary components that may be included in a user device included in the environment shown in FIG. **1**;

FIG. **4** shows a diagram of exemplary components that may be included in a computing device included in the environment shown in FIG. **1**;

FIGS. **5**-**7** show flow diagrams of an exemplary process for activating a user device included in the environment shown in FIG. **1**;

FIGS. **8** and **9** show exemplary interfaces that may be presented for display to a user device included in the environment of FIG. **1** in connection with activating another user device included in the environment of FIG. **1**; and

FIG. **10** shows an exemplary system in which user devices included in the environment of FIG. **1** may operate after being activated by the processes of FIGS. **5**-**7**.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The following detailed description refers to the accompanying drawings. The same reference numbers in different drawings may identify the same or similar elements. Also, the following detailed description does not limit the invention.

Implementations discussed herein relate to coupling a first user device and second user device. The first user device may acquire device data associated with the second user device and form a registration request that includes the device data and information associated with the first user device. The first user device may forward the registration request to a registration device that authenticates the second user device based on the information associated with the first user device. Activation data may be determined based on the device data, and activation data may be forwarded to the second user device to enable the second user device to access a restricted service or data.

As used herein, the terms "user," "consumer," "subscriber," and/or "customer" may be used interchangeably. Also, the terms "user," "consumer," "subscriber," and/or "customer" are intended to be broadly interpreted to include a user device or a user of a user device.

FIGS. **1**A and **1**B are diagrams of an exemplary environment **100** in which systems and methods described herein may be implemented. As illustrated in FIGS. **1**A and **1**B, environment **100** may include a first user device **110** that may be coupled to a second user device **120** to receive second user device data **101**. First user device **110** may generate a registration request **102** using the second user device data **101** and may forward registration request **102** to a registration device **140** via a registration network **130**. Registration device **140** may evaluate registration request **102** and may forward authorization data **103** to an activation device **150** when registration request **102** is accepted. Activation device **150** may then forward activation data **104** via activation network **160** directly or indirectly to, and used by, second user device **120**.

Continuing with environment **100**, first user device **110** and second user device **120** may include any devices that are capable of communicating to exchange second user device data **101**. For example, user devices **110** and **120** may include a laptop computer, a tablet computer, a notebook computer, a personal computer (PC), an ultra mobile personal computer (UMPC), a netbook, a game-playing device/console, or other types of computation or communication devices, threads or processes running on these devices, and/or objects executable by these devices. User devices **110** and **120** may also include a communication device, such as a voice over Internet protocol (VoIP) telephone (e.g., a session initiation protocol (SIP) telephone), a personal digital assistant (PDA) that can include a radio, a mobile telephone (e.g., a cell phone), a smart phone (e.g., that may combine a cellular radio with data processing and data communications capabilities), a personal locator device (e.g., a device that outputs a location signal), a short messaging service (SMS) device (e.g., a pager), etc.

In one implementation, first user device **110** may include a user interface (e.g., user input/output components) to receive and provide information to an associated user whereas second user device **120** may be a "headless" device that does not include user input/output components.

As described in greater detail with respect to FIGS. **2**A-**2**C, first user device **110** and second user device **120** may be coupled to exchange second user device data **101**, activation data **104**, etc.

Returning to FIGS. **1**A and **1**B, second user device data **101** may include, for example, information identifying second user device **120**. For example, second user device data **101** may identify a model number and a manufacturer associated with second user device **120**. Additionally or alternatively, second user device data **101** may include a device identifier, such as a serial number, an international mobile station equipment identity (IMEI) number, a mobile equipment identifier (MEID), etc. Second user device data **101** may identify services and/or resources requested by second device **120**. For example, second user device data **101** may identify a requested communication channel and/or an application to be accessed by second user device **120**.

Continuing with environment **100** in FIGS. **1**A and **1**B, first user device **110** may form registration request **102** based on the second user device data **101**. For example, registration request **102** may include information identifying: (1) first user device **110**, (2) second user device **120**, (3) an associated user, (4) payment information, (5) desired services to be provided to second user device **120**, etc. First user device **110** may present an interface, such as a graphical user interface (GUI) that displays registration options and accepts inputs (e.g., via a mouse, not shown) from the user related to selecting information to include in registration request **102**.

Continuing with environment **100** in FIGS. **1**A and **1**B, registration device **140** may process registration request **102**. For example, registration device **140** may verify that payment information included in registration request **102** is valid and that an associated user is authorized to use the payment information. Registration device **140** may further verify that payment information included in registration request **102** is suf-

ficient to pay for services to second user device **120** requested in registration request **102**. In one implementation, registration device **140** may evaluate registration request **102** to identify first user device **110** and determine whether first user device **110** is previously registered. Registration device **140** may then register second user device **120** using data associated with first user device **110** (e.g., payment information associated with first user device **110**).

After processing registration request **102** (e.g., verifying payment information to associate with second user device **120**), registration device **140** may forward authorization data **103** to activation device **150**. Authorization data **103** may include an indication that second user device **120** is eligible for activation. Authorization data **103** may also include information identifying second user device **120** and services requested by second user device **120** from a service provider. Registration device **140** may further include information in authorization data **103** that is not included and/or different from the data included in registration request **102**. For example, authorization data **103** may include information collected by registration device **140** during the registration of first user device **110**, such as a location and/or services associated with first user device **110**.

Registration device **140** may further update account data to reflect the registration of second user device **120**. For example, registration device **140** may store data indicating that second user device **120** is authorized to access services and/or data requested in second user device data **101**.

Continuing with environment **100** in FIGS. **1**A and **1**B, activation device **150** may process authorization data **103** and determine activation data **104** to send to second user device **120**. For example, activation data **104** may include instructions and/or data to activate second user device **120**. Activation device **150** may determine the contents of activation data **104** based on the contents of authorization data **103**. Activation device **150** may determine services and/or data requested by second user device **120** (e.g., in second user device data **101**) and may include information in activation data **104** to enable second user device **120** to access the requested services and/or data. Activation data **104** may include an application that, when implemented by second user device **120**, enables second user device **120** to access the requested services and/or data. For example, the application included with the activation data may activate a communication component (not shown in FIGS. **1**A and **1**B) included in second user device **120** and direct the activated communication component to acquire the requested services and/or data. In another example, activation data **104** may include an access code or other license that allows second user device **120** to access the requested services and/or data, such as digital contents (e.g., a movie or television show).

As shown in FIGS. **1**A and **1**B, registration network **130** may carry registration request **102** between first user device **110** and registration device **140**, and activation network **160** may carry activation data **104** between activation device **150** and one or more of first user device **110** or second user device **120**.

Registration network **130** and activation network **160** may include, for example, one or more wired, wireless and/or optical networks that are capable of receiving and transmitting data, voice and/or video signals, including multi-media signals that include voice, data and video information. For example, registration network **130** and activation network **160** may include one or more public switched telephone networks (PSTNs) or other type of switched network. Registration network **130** and activation network **160** may also include one or more wireless networks and may include a number of transmission towers for receiving wireless signals and forwarding the wireless signals toward the intended destinations. Registration network **130** and activation network **160** may alternatively include one or more satellite networks, one or more packet switched networks, such as an Internet protocol (IP) based network, a local area network (LAN), a wide area network (WAN), a personal area network (PAN) (e.g., a wireless PAN), an intranet, the Internet, or another type of network that is capable of transmitting data.

In one implementation, registration network **130** and activation network **160** are different networks. For example, registration network **130** and activation network **160** may operate on different transmission media and/or protocols.

As shown in FIG. **1**A, activation device **150** may forward activation data **104** to first user device **110** via an activation network **160**, and first user device **110** may forward activation data **104** to second user device **120**. Second user device **120** may use the activation data **104** to activate, such as to access to limited network resources. Alternatively, as shown in FIG. **1**B, activation device **150** may forward activation data **104** to directly to second user device **120** via activation network **160**.

The exemplary configurations illustrated in FIGS. **1**A and **1**B are provided for simplicity. It should be understood that environment **100** may be more complex and include more or fewer devices than those illustrated in FIGS. **1**A and **1**B. For example, environment **100** may also include additional elements, such as switches, gateways, routing devices, backend systems, etc., that aid in routing information between first and second user devices **110** and **120**, registration device **140**, and activation device **150**. Also, in some instances, one or more of the components of environment **100** may perform one or more functions described as being performed by another one or more of the components of environment **100**. For example, activation device **150** may be included as a component of registration device **140**.

FIGS. **2**A-**2**C show exemplary connections coupling first user device **110** and second user device **120** in environment **100**. As described with respect to FIGS. **1**A and **1**B, first user device **110** and second user device **120** may couple to exchange second user device data **101**, activation data, etc.

In the implementation shown in FIG. **2**A, first user device **110** may include a headphone jack **210** to receive an audio interface **220** that may be included in second user device **120**. Audio interface **220** may include a first input (or left audio) terminal **222**, a second input (or right audio) terminal **224**, an output (or microphone) terminal **226**, and a grounding terminal **228** that may electrically connect to a grounding terminal in headphone jack **210**. When audio interface **220** is coupled to headphone jack **210** (e.g., audio interface **220** is inserted into headphone jack **210** in direction **201**), second user device **120** may (1) receive data (e.g., activation data **104**) from first user device **110** via one of first input terminal **222** or second input terminal **224**; and (2) transmit data (e.g., second user device data **101**) to first user device **110** via output terminal **226**. Accordingly, in one implementation, second user device **120** may receive power from first user device **110** via one of first input terminal **222** or second input terminal **224** (i.e., the one of first input terminal **222** or second input terminal **224** not used to transmit data from first user device **110** to second user device **120**.

In another implementation shown in FIG. **2**B, first user device **110** may include a first input port **230**, and second user device **120** may include a second input port **240**. For example, ports **230** and **240** of first user device **110** and second user device **120** may be a universal serial bus (USB) or other type of data port.

A cable **250** may include a first end **252** that couples to first input port **230** (e.g., inserted into first input port **230** in direction **202**), and a second end **254** that couples to second input port **240** (e.g., inserted into second input port **240** in direction **203**) to enable data (e.g., second user device data **101** and/or activation data **104**) to be exchanged between first user device **110** and second user device **120**.

In an implementation shown in FIG. **2**C, first user device **110** may include a first transmission unit **260**, and second user device **120** may include a second transmission unit **270**. First transmission unit **260** and second transmission unit **270** may interact to provide a short-range wireless connection **280** (e.g., WiFi®, Bluetooth®, etc.) between first transmission unit **260** and second transmission unit **270**. Short-range wireless connection **280** may carry data to be exchanged between first user device **110** and second user device **120** (e.g., second user device data **101** and/or activation device activation data **104**).

The exemplary configurations illustrated in FIGS. **2**A-**2**C are intentionally simple to enhance clarity of presentation. It should be understood that a connection between first user device **110** and second user device **120** may include more or fewer devices than those illustrated in FIGS. **2**A-**2**C. For example, wireless connection **280** may be transferred by additional elements, such as switches, gateways, routing devices, backend systems, etc., that aid in routing information between first and second user devices **110** and **120**.

FIG. **3** is a schematic diagram that shows exemplary components of a device **300** that may correspond to first user device **110** or second user device **120**. As shown in FIG. **3**, device **300** may include, for example, a processing unit **310**, a memory **320**, a user interface **330**, a communication interface **340**, and an antenna assembly **350**. Although FIG. **3** shows example components of device **300**, in other implementations, device **300** may include fewer components, additional components, different components, or differently arranged components than depicted in FIG. **3**. In still other implementations, one or more components of device **300** may perform one or more tasks described as being performed by one or more other components of device **300**.

A processing unit **310** may include a processor, a microprocessor, an ASIC, a FPGA, or the like. A processing unit **310** may control operation of device **300** and its components. In one implementation, a processing unit **310** may control operation of components of device **300** in a manner similar to that described herein. Memory **320** may include a RAM, a ROM, and/or another type of memory to store data and/or instructions that may be used by a processing unit **310**. User interface **330** may include mechanisms for inputting information to device **300** and/or for outputting information from device **300**. Examples of input and output mechanisms might include buttons (e.g., control buttons, keys of a keypad, a keyboard, a joystick, etc.); a touch screen interface to permit data and control commands to be input into device **300** via a touch screen; a biometric device to receive fingerprint scans, retinal scans, facial signatures, etc.; a speaker (e.g., a speaker operated by an audio interface) to receive electrical signals and output audio signals; a microphone (e.g., a microphone operated in conjunction with signals on terminal **226**) to receive audio signals and output electrical signals; a display (e.g., a touch screen) to output visual information (e.g., user interfaces, web pages, etc.); a vibrator to cause device **300** to vibrate; and/or a camera (e.g., a camera) to receive video and/or images.

Communication interface **340** may include, for example, a transmitter that may convert baseband signals from a processing unit **310** to RF signals and/or a receiver that may convert RF signals to baseband signals. Alternatively, communication interface **340** may include a transceiver to perform functions of both a transmitter and a receiver of wireless communications (e.g., radio frequency, infrared, visual optics, etc.), wired communications (e.g., conductive wire, twisted pair cable, coaxial cable, transmission line, fiber optic cable, waveguide, etc.), or a combination of wireless and wired communications. Communication interface **340** may connect to antenna assembly **350** for transmission and/or reception of the RF signals.

Antenna assembly **350** may include one or more antennas to transmit and/or receive RF signals over the air. Antenna assembly **350** may, for example, receive RF signals from communication interface **340** and transmit them over the air, and receive RF signals over the air and provide them to communication interface **340**. In one implementation, for example, communication interface **340** may communicate with a network and/or devices connected to a network.

As described in detail below, device **300** may perform certain operations described herein in response to a processing unit **310** executing software instructions of an application contained in a computer-readable medium, such as memory **320**. The software instructions may be read into memory **320** from another computer-readable medium or from another device via communication interface **340**. The software instructions contained in memory **320** may cause a processing unit **310** to perform processes that will be described later. Alternatively, hardwired circuitry may be used in place of or in combination with software instructions to implement processes described herein. Thus, implementations described herein are not limited to any specific combination of hardware circuitry and software.

Although FIG. **3** depicts exemplary components of device **300**, in other implementations, device **300** may include fewer components, additional components, different components, or differently arranged components than those illustrated in FIG. **3**. Furthermore, one or more components of device **300** may perform one or more tasks described as being performed by one or more other components of device **300**.

FIG. **4** is a diagram illustrating exemplary components of a device **400**. Device **400** may correspond, for example, to registration device **140** or activation device **150** and may be implemented/installed as a combination of hardware and software on one or more devices **400**. As shown in FIG. **4**, device **400** may include, for example, a bus **410**, a processing unit **420**, a memory **430**, one or more input devices **440**, one or more output devices **450**, and a communication interface **460**.

Bus **410** may permit communication among the components of device **400**. Processing unit **420** may include one or more processors or microprocessors that interpret and execute instructions. In other implementations, processing unit **420** may be implemented as, or include, one or more application specific integrated circuits (ASICs), field programmable gate arrays (FPGAs), or the like.

Memory **430** may include a random access memory (RAM) or another type of dynamic storage device that stores information and instructions for execution by processing unit **420**, a read only memory (ROM) or another type of static storage device that stores static information and instructions for the processing unit **420**, and/or some other type of magnetic or optical recording medium and its corresponding drive for storing information and/or instructions.

Input device **440** may include a device that permits a user to input information to device **400**, such as a keyboard, a keypad, a mouse, a pen, a microphone, one or more biometric mecha-

nisms, and the like. Output device **450** may include a device that outputs information to the user, such as a display, a speaker, etc.

Communication interface **460** may include any transceiver-like mechanism that enables device **400** to communicate with other devices and/or systems. For example, communication interface **460** may include mechanisms for communicating with other devices, such as other devices of network environment **100**. In one implementation, communications interface **460** may support short range wireless network communications (e.g., via Bluetooth protocols). In another implementation, communications interface **460** may support long range wireless network communications (e.g., cellular network services). In other implementations, communication interface **460** may support other wired or wireless network communications.

As described herein, device **400** may perform certain operations in response to processing unit **420** executing software instructions stored in a computer-readable medium, such as memory **430**. A computer-readable medium may include a non-transitory tangible memory device. A memory device may be implemented within a single physical memory device or spread across multiple physical memory devices. The software instructions may be read into memory **430** from another computer-readable medium or read into memory **430** from another device via communication interface **460**. The software instructions stored in memory **430** may cause processing unit **420** to perform processes described herein. Alternatively, hardwired circuitry may be used in place of, or in combination with, software instructions to implement processes described herein. Thus, implementations described herein are not limited to any specific combination of hardware circuitry and software.

Although FIG. **4** shows exemplary components of device **400**, in other implementations, device **400** may include fewer components, different components, differently-arranged components, or additional components than those depicted in FIG. **4**. As an example, in some implementations, a display may not be included in device **400**. In these situations, device **400** may be a "headless" device that does not include input device **440**. Alternatively, or additionally, one or more components of device **400** may perform one or more other tasks described as being performed by one or more other components of device **400**.

FIG. **5** is a flow diagram illustrating an exemplary process **500** for a user-initiated activation of second user device **120**. In one implementation, process **500** may be performed by first user device **110** in combination with second user device **120**. In other implementations, process **500** may be performed by one or more other devices of environment **100**, such as registration device **140** and/or activation device **150**.

As shown in FIG. **5**, process **500** may include activating first user device **110** (block **510**). For example, first user device **110** may be activated by a representative of an associated service provider or a vendor of the first user device **110**.

In one implementation, activation of the first user device **110** may be initiated by an associated user. FIG. **6** is a flow diagram illustrating an exemplary process **600** for a user-initiated activation of first user device **110**. In one implementation, process **600** may be performed by first user device **110**. In other implementations, process **600** may be performed by one or more other devices of environment **100**, such as second user device **120**, registration device **140**, and/or activation device **150**.

As shown in FIG. **6**, process **600** may include providing an interface to receive registration data (block **610**). For example, first user device **110** may provide in interface to prompt the associated user to submit requested data related to registering first user device **110**.

Skipping FIG. **7** for the moment, an exemplary first registration interface **800**, which may be provided by first user device **110**, is shown in FIG. **8**. First registration interface **800** may include, for example, a first device identifier field **810** to receive a user input specifying an identifier (e.g., a serial number, an IMEI number, a MEID) associated with first user device **110** (shown FIG. **8** as "Number: XXXXXXXX"). First registration interface **800** may further include, for example, a first user identifier field **820** to receive a user input identifying an associated user (shown in FIG. **8** as "First Name, Last Name") and an first associated location field **830** to receive a user input identifying a location associated with the user (shown in FIG. **8** as "ROAD A, BETWEEN STREET A AND STREET B"). In one implementation shown in FIG. **8**, first associated location field **830** may further provide a map providing a graphical representation of the identified location.

Continuing with FIG. **8**, first registration interface **800** may further include, for example, a first payment data field **840** to receive user input identifying payment information associated with the user (shown in FIG. **8** as "FINANCIAL ACCOUNT NUMBER"). For example, first payment data field **840** may receive a credit card number or other information used to charge the associated user (identified in first user identifier field **820**).

First user device **110** may verify first payment data field **840**. For example, first user device **110** may determine whether the financial account numbers specified in first payment data field **840** are associated with data provided in first user identifier field **820** and/or first associated location field **830**. To verify first payment data field **840**, first user device **110** may forward information collected in first registration interface **800** to another device, such as registration device **140**, for verification.

In one implementation, first device identifier field **810**, first user identifier field **820**, first associated location field **830**, and first payment data field **840** may be automatically determined by first user device **110** (i.e., without a user input). For example, first user device **110** may populate first registration interface **800** based on data stored by first registration interface **800**, by (1) determining the contents of first device identifier field **810** based on stored device information; (2) determining the contents of first user identifier field **820** and first associated location field **830** based on stored contact information; and/or (3) determining the contents of first payment data field **840** based on stored financial information.

Continuing with FIG. **8**, first registration interface **800** may include first service option field **850** (shown in FIG. **8** as "SERVICE OPTION **1**" and "SERVICE OPTION **2**"). The contents of first service option field **850** may be determined by first user device **110** (or another device such as registration device **140**) based on other data collected in first registration interface **800**. For example, first service option field **850** may identify service options available to a device type associated with first user device **110** (based on first device identifier field **810**) at the location specified in first associated location field **830**.

As further shown in FIG. **8**, first service option field **850** may include one or more graphical elements **852** that a user may select (e.g., by submitting a particular input, touching an associated portion of a touch screen, etc.) to select from first service option field **850**.

As noted above, an exemplary first registration interface **800** is shown in FIG. **8**. It should be appreciated that first registration interface **800** is provided purely for purposed of

example, and first registration interface **800** may include additional, fewer, or different fields of information. Furthermore, it should be appreciated that first registration interface **800** may be modified to reposition fields **810**-**850**.

Returning to FIG. **6**, process **600** may include forwarding the registration data for authentication (block **620**), and receiving activation data (block **630**). For example, first user device **110** may forward the registration data collected in block **610** (e.g., via first registration interface **800**) to registration device **140**, and activation device **150** may forward data, for receiving, by second user device **120** directly through activation network **160** or indirectly through activation network and first user device **110** for activating second user device **120**. For example, activation device **150** may provide information and/or programs to enable the service options selected via service option field **850**.

Continuing with FIG. **6**, process **600** may include accessing services using the activation data (block **640**). First user device **110** may use the activation data received in block **630** to enable the service options selected via service option field **850**. For example, the activation data may enable first user device **110** which may be configured to access desired services. For example, the activation data may activate a component of first user device **110** to enable communication via a network or to access particular data.

Returning to FIG. **5**, process **500** may include coupling second user device **120** to the activated first user device **110** (block **520**). For example, as described above with respect to FIG. **2**A, second user device **120** may include a component (e.g., audio interface **220**) that connects to a component of first user device **110** (e.g., headphone jack **210**). In other examples described above with respect to FIGS. **2**B and **2**C, first user device **110** and second user device **120** may also connect via a wired connection (e.g., wire **250**) or a wireless connection (e.g., short-range wireless connection **280**.

Continuing with FIG. **5**, process **500** may include first user device **110** receiving registration data from second user device **120** (block **530**). For example, first user device **110** may interact with second user device **120** to obtain second user device data **101**, such as a device identifier associated with second user device **120**.

In one implementation, when receiving registration data from second user device **120** in process block **530**, first user device **110** may provide an exemplary second registration interface **900**, as shown in FIG. **9**. Second user device **120** is shown connected to second registration interface **900** in FIG. **9**, as described above with respect to FIG. **2**A, but it should be appreciated that first user device **110** and second user device **120** may communicate in other ways, such as the implementations discussed with respect to FIGS. **2**B and **2**C. Second registration interface **900** may include, for example, a second device identifier field **910** to present an identifier (e.g., a serial number, an IMEI number, a MEID) associated with second user device **120** (shown FIG. **9** as "Number: YYYYYYYY"). For example, first user device **110** may determine the contents of second device identifier field **910** based on device information stored by second user device **120**.

Continuing with FIG. **9**, second registration interface **900** may further include, for example, (1) a second user identifier field **920** identifying an associated user (shown in FIG. **9** as "First Name, Last Name"); (2) an second associated location field **930** identifying a location associated with the user (shown in FIG. **9** as "ROAD A, BETWEEN STREET A AND STREET B"); and (3) a second payment data field **940** identifying payment information associated with the user (shown in FIG. **9** as "FINANCIAL ACCOUNT NUMBER"). For example, second payment data field **940** may present a credit card number or other information used to charge the associated user (identified in second user identifier field **920**).

In one implementation, first user device **110** may populate portions of second registration interface **900** based on data associated with first user device **110**, such as data obtained via first registration interface **800**. For example, second user identifier field **920**, second associated location field **930**, and second payment data field **940** may correspond, respectively, first user identifier field **820**, first associated location field **830**, and first payment data field **840**.

Continuing with FIG. **9**, second registration interface **900** may include second service option field **950** (shown in FIG. **9** as "SERVICE OPTION **3**," "SERVICE OPTION **4**," and "SERVICE OPTION **5**"). The second service option field **950** may be determined by first user device **110** (or another device such as registration device **140**) based on second user device data **101** from second user device **120**. For example, second service option field **950** may identify service options available to a device type associated with second user device **120** (determined based on second device identifier field **910**) at the location specified in second associated location field **930**.

In one implementation, service options identified in second service option field **950** may further be identified based on information associated with first user device **110**. For example, services available to second user device **120** may depend on account information, a location, prior activity, financial information, etc. associated with a user of first user device **110**.

As noted above, exemplary second registration interface **900** is shown in FIG. **9**. It should be appreciated that second registration interface **900** is provided purely for purposed of example, and second registration interface **900** may include additional, fewer, or different fields of information. Furthermore, it should be appreciated that second registration interface **900** may be modified to reposition fields **910**-**950**.

Returning to FIG. **5**, process **500** may further include registering second user device **120** using the registration data received in process block **530** (block **540**). For example, first user device **110** may forward information identifying an associated user and linking second user device **120** with the identified user.

FIG. **7** is a flow diagram illustrating an exemplary process **700** for activating second user device **120** in process step **540**. In one implementation, process **700** may be performed by first user device **110**. In other implementations, process **700** may be performed by one or more other devices of environment **100**, such as second user device **120**, registration device **140**, and/or activation device **150**.

As shown in FIG. **7**, process **700** may include forming a registration request **102** based on the received registration data (block **710**). For example, registration request **102** may include information linking first user device **110** and second user device **120**. For example, second user device **120** may be activated based on account information associated with first user device **110**. In another example, the registration request may include technical information associated with first user device **110** and/or second user device **120**, such as information identifying included components, etc.

Continuing with FIG. **7**, process **700** may include forwarding registration request **102** to registration device **140** (block **720**). For example, as described above with respect to FIGS. **1**A and **1**B, first user device **110** may forward registration request **102** to registration device **140** via registration network **130**, and registration device **140** may generate authorization data **103** to forward to activation device **150**.

Continuing with FIG. **7**, process **700** may include receiving activation data **104** for second user device **120** (block **730**)

and activating second user device **120** using activation data **104** (block **740**). For example, as described above with respect to FIG. **1**A, first user device **110** may receive activation data **104** from activation device **150** via activation network **160**, and may forward activation data **104** to second user device **120**. Alternatively, as described above with respect to FIG. **1**B, second user device **120** may receive activation data **104** from activation device **150** via activation network **160**, and may use activation data **104** to activate itself.

FIG. **10** shows an exemplary system **1000** in which user equipment (UE) **1010** (corresponding to the first user device **110** and location device **1020** (corresponding to the second user device **120**) may operate based on processes **500**, **600**, and **700**. In this example, UE **1010** may include, for example, to a smart phone, a mobile computer, tablet or other device that exchanges data with one or more of evolved nodes B (or eNodes B) **1030-1**, **1030-2**, . . . **1030**-N (referred to collectively as eNodes B **1030** and individually as an eNode B **1030**) and location device **1020**. UE **1010** may further couple to location device **1020** to receive second user device data **101** (used to form a registration request **102** forwarded to an eNode B **1030**) and to provide activation data **104** that is received from the eNode B **1030**. For example, as described above with respect to FIG. **2**A, UE **1010** may include a headphone jack adapted to receive audio interface **220** included in location device **1020**.

In this example, registration request **102** may include information identifying UE **1010** and location device **1020**, and eNode B **1030** may register UE **1010** and location device **1020** based on receiving registration request **102** and may forward network identifiers to UE **1010** and/or location device **1020** in activation data **104**. eNode B **1030** may further store information associating UE **1010** and location device **1020**

Location device **1020** may be a device that provides signaling to one or more eNode B **1030** to enable a position of location device **1020** to be determined. Location device **1020** may have limited communications and/or interface capabilities. Location device **1020** may include, for example, a battery and a mechanism (e.g., a transmitter) to forward a status signal to one or more eNodes B **1030**. When coupled to UE **1010**, the battery in location device **1020** may be charged, and location device **1020** may receive an associated network identifier included in activation data **104**. Location device may send a presence message **1001** (e.g., a ping or other status notification) to one or more eNodes B **1030**, and the presence message **1001** may include information associated with the network identifier for the location device **1020**.

Based on receiving presence message **1001**, an eNode B **1030** may determine the geographic position of location device **1020** (e.g., based on the contents of presence message **1001** and/or associated characteristics of presence message **1001**). For example, eNodes B **1030** may determine the location of location device **1020** based on comparison of signal strengths, receipt times, etc., associated with receiving the presence message **1001** at the eNodes B **1030**.

In one implementation, location device **1020** may include a mechanism to receive location information, such as a global positioning signal (GPS) from a GPS satellite, and location device **1020** may determine an associated geographical position based on the GPS signal. Location device **1020** may further include information in presence message **1001** identifying the associated geographical position.

In addition or alternatively, location device **1020** may include hardware/software to generate verifying information, such as authentication code that is periodically generated (e.g., every minute) using an encoded random key, or seed, and location device **1020** may include the verifying information in presence message **1001**. For example, the encoded random key may related to the device identifier. ENode B **1030** may use knowledge of the encoded random key to verify and/or identify the location device **1020**. For example, ENode B **1030** may perform a modulo operation based on a key associated with location device **1020** to decoded information included in the presence message **1001** to recover the device identifier or other information for location device **1020**.

An eNode B **1030** may store information associating the determined geographic position with the network identifier associated with location device **1020** in a home location register (HLR), a central database containing details of subscriber devices that are authorized to access a core network, or other repository.

UE **1010** and eNode B **1030** may exchange location request information **1002** to determine the geographic position of location device **1020**. For example, location request information **1002** may include information identifying UE **1010**, and eNode B **1030** may determine that UE **1010** is associated with location device **1020** and is authorized to determine the position of location device **1020** based on previously received registration request **102**. The eNode B may access the HLR to determine a most recent position of location device **1020** and report this potion to UE **1010**.

Thus, in the example described in system **1000** shown in FIG. **10**, location device **1020** may be registered with eNodes B **1030** without receiving any information from eNodes B **1030**, thereby allowing location device **1020** to use a minimum amount of power. Furthermore, the position of location device **1020** can only be accessed by an authorized UE **1010**.

In another implementation, another UE **1010** (not shown) may be registered with eNode B **1030** to access the position associated with a registered location device **1020**. For example, an audio interface **220** for location device **1020** may be coupled to a headphone jack **210** associated with the other UE **1010**, and the other UE **1010** may determine a device identifier for location device **1020** based the coupling. The other UE **1010** may then use the device identifier for location device **1020** to later request, from eNode B **1030**, the position of location device **1020**.

Although FIG. **10** depicts exemplary devices included in system **1000**, in other implementations, system **1000** may include fewer devices, additional devices, different devices, or differently arranged devices than those illustrated in FIG. **10**. Furthermore, one or more devices of system **1000** may perform one or more tasks described as being performed by one or more other devices of system **1000**.

While a series of blocks has been described with respect to FIGS. **5-7**, the order of the blocks in processes **500**, **600**, and **700** may be modified in other implementations. Furthermore, non-dependent blocks may be performed in parallel. Furthermore, processes **500**, **600**, and **700** may include additional and/or fewer blocks than shown in FIGS. **5-7**. For example, the activation of the first user device **110** in process **600** may further include capturing an image of the associated user and verifying that the captured image corresponds to another image of the user in a driver's license or other identification of the user of first user device **110**.

Also, various preferred embodiments have been described herein with reference to the accompanying drawings. It will, however, be evident that various modifications and changes may be made thereto, and additional embodiments may be implemented, without departing from the broader scope of the invention as set forth in the claims that follow. The specification and drawings are accordingly to be regarded in an illustrative rather than restrictive sense. For example, in

another implementation, second user device **120** may include a sensor, such as a card reader, to receive payment information to be applied with respect to activating second user device **120**.

It will be apparent that different aspects of the description provided above may be implemented in many different forms of software, firmware, and hardware in the implementations illustrated in the figures. The actual software code or specialized control hardware used to implement these aspects is not limiting of the implementations. Thus, the operation and behavior of these aspects were described without reference to the specific software code—it being understood that software and control hardware can be designed to implement these aspects based on the description herein.

Even though particular combinations of features are recited in the claims and/or disclosed in the specification, these combinations are not intended to limit the disclosure of the possible implementations. In fact, many of these features may be combined in ways not specifically recited in the claims and/or disclosed in the specification. Although each dependent claim listed below may directly depend on only one other claim, the disclosure of the implementations includes each dependent claim in combination with every other claim in the claim set.

In the preceding specification, various preferred embodiments have been described with reference to the accompanying drawings. It will, however, be evident that various modifications and changes may be made thereto, and additional embodiments may be implemented, without departing from the broader scope of the invention as set forth in the claims that follow. The specification and drawings are accordingly to be regarded in an illustrative rather than restrictive sense.

No element, act, or instruction used in the present application should be construed as critical or essential unless explicitly described as such. Also, as used herein, the article "a" is intended to include one or more items. Where only one item is intended, the term "one" or similar language is used. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

What is claimed is:

1. A method comprising:

acquiring, by a first user device, device data associated with a second user device, wherein the second user device is not configured to communicate with a registration device when the device data is acquired, wherein the first user device includes a headphone jack and the second user device includes an audio interface, wherein the audio interface is configured to be inserted into the headphone jack to couple the first user device and the second user device, and wherein the audio interface includes a first input terminal;

forming, by the first user device, a registration request that includes the device data associated with the second user device and information associated with the first user device, wherein the information associated with the first user device identifies an associated user;

forwarding, by the first user device, the registration request to the registration device, wherein the registration device authenticates the second user device based on the information associated with the first user device, and wherein activation data is determined based on the registration device authenticating the second user device;

receiving, by the first user device, the activation data; and

forwarding, by the first user device, the activation data to the second user device via the first input terminal, wherein the second user device uses the activation data to become active, wherein the second user device, when active, forwards a location message that is used to determine a geographic position of the second user device, and wherein the first user device uses data from the registration request to access information identifying the geographic position of the second user device.

2. The method of claim **1**, wherein a data path is formed between the first user device and the second user device based on the audio interface being inserted into the headphone jack, and

wherein acquiring the device data associated with the second user device further includes:

transferring the device data to the first user device from the second user device via the data path.

3. The method of claim **1**, wherein forming the registration request further includes:

providing a first interface to receive the information associated with the first user device.

4. The method of claim **3**, wherein forming the registration request further includes:

providing a second interface to receive data related to the registration request, wherein portions of the second interface are automatically populated with the information associated with the first user device.

5. The method of claim **1**, wherein the second user device is a headless device.

6. The method of claim **1**, wherein the device data associated with the second user device identifies at least one of:

a model number associated with the second user device,

a manufacturer associated with the second user device,

a serial number associated with the second user device,

an international mobile station equipment identity (IMEI) number associated with the second user device,

a mobile equipment identifier (MEID) associated with the second user device, or

a service or a resources requested by the second user device.

7. The method of claim **1**, wherein the first user device forwards the registration request to the registration device via a first network, and the first user device receives the activation data via a second network that differs from the first network, wherein the second user device is not configured to access the first network prior to the second user device becoming active.

8. The method of claim **1**, wherein the audio interface further includes a second input terminal, and wherein the method further includes:

providing power to the second user device via the second input terminal.

9. A first user device comprising:

a memory configured to store information associated with the first user device;

a headphone jack; and

a processor configured to:

acquire device data associated with a second user device, wherein the second user device is not configured to communicate with a registration device when the device data is acquired, wherein the second user device includes an audio interface, wherein the audio interface is configured to be inserted into the headphone jack to couple the first user device and the second user device, wherein the audio interface includes an output terminal, and wherein the processor is further configured to acquire the device data via the output terminal

form a registration request that includes the device data associated with the second user device and the information associated with the first user device, wherein

the information associated with the first user device identifies an associated user, and

forward the registration request to the registration device, wherein the registration device authenticates the second user device based on the information associated with the first user device, wherein activation data is determined based on the registration device authenticating the second user device, wherein the second user device is configured to receive the activation data and to become active using the activation data, and wherein the second user device, when active, forwards a location message that is used to determine a geographic position of the second user device, and the first user device uses data from the registration request to access information identifying the geographic position of the second user device.

10. The first user device of claim **9**, wherein the processor, when acquiring the device data associated with the second user device, is further configured to:

establish a data path for transferring the device data to the first user device from the second user device.

11. The first user device of claim **9**, wherein the processor is further configured to:

provide a first interface to receive the information associated with the first user device.

12. The first user device of claim **11**, wherein the processor is further configured to:

provide a second interface to receive data related to the registration request, wherein portions of the second interface are automatically populated based on the information associated with the first user device obtained via the first interface.

13. The first user device of claim **12**, wherein the second interface identifies service options available to the second user device, and wherein the service options available to the second user device are determined based on service options available to the first user device.

14. The first user device of claim **9**, wherein the audio interface includes a first input terminal, and

wherein the processor is further configured to:

receive the activation data, and

forward the activation data to the second user device via the first input terminal.

15. The first user device of claim **14**, wherein the audio interface further includes a second input terminal, and

wherein the processor is further configured to:

provide power to the second user device via the second input terminal.

16. A non-transitory computer-readable medium to store instructions, the instructions comprising:

one or more instructions that when executed by a first user device, cause the first user device to:

acquire device data associated with a second user device, wherein the first user device includes a headphone jack, the second user device includes an audio interface, and the audio interface is configured to be inserted into the headphone jack to couple the first user device and the second user device, wherein the audio interface includes an output terminal, and wherein the one or more instructions further cause the first user device to acquire the device data via the output terminal,

form a registration request that includes the device data associated with the second user device and information associated with the first user device, and

forward the registration request to a registration device, wherein the registration device authenticates the second user device based on the information associated with the first user device, wherein activation data is determined based on the registration device authenticating the second user device, wherein the second user device is configured to receive the activation data and to become activated using the activation data, and wherein the second user device, when active, forwards a location message that is used to determine a geographic position of the second user device, and the first user device uses data from the registration request to access information identifying the geographic position of the second user device.

17. The non-transitory computer-readable medium of claim **16**, wherein the audio interface includes a first input terminal, and

wherein the one or more instructions further cause the first user device to:

receive the activation data, and

forward the activation data to the second user device via the first input terminal.

18. The non-transitory computer-readable medium of claim **17**, wherein the audio interface further includes a second input terminal, and

wherein the one or more instructions further cause the first user device to:

provide power to the second user device via the second input terminal.

19. The non-transitory computer-readable medium of claim **16**, wherein the instructions further include:

one or more instructions that when executed by the first user device, cause the first user device to:

provide an interface to receive data related to the registration request, wherein portions of the interface are automatically populated based on the information associated with the first user device.

20. The non-transitory computer-readable medium of claim **16**, wherein the device data associated with the second user device identifies at least one of:

a model number associated with the second user device,

a manufacturer associated with the second user device,

a serial number associated with the second user device,

an international mobile station equipment identity (IMEI) number associated with the second user device,

a mobile equipment identifier (MEID) associated with the second user device, or

a service or a resources requested by the second user device.

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